Davison Maintenance
User Manual
from On-line Help

Davison Software

Davison Systems, LLC

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Davison Maintenance System

Partial from On-Line Help

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Davison Maintenance Overview

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Davison Maintenance is a comprehensive maintenance management system (CMMS). It manages work done by personnel on equipment for corrective and preventive maintenance, tracking personnel time and equipment costs. Davison Maintenance includes:

- Equipment records.
- Corrective maintenance work orders.
- Preventive maintenance task scheduling.
- Predictive maintenance to monitor equipment.
- Cost tracking and analysis.
- Personnel Management.
- Programming and technical support from a developer.

- Detailed management reports help you justify equipment costs and manpower needs.
- Predictive maintenance is integrated as a practical system to anticipate equipment failure.

Paul Davison developed this application after several years of creating and supporting CMMS programs. We provide software designed with experience, combined with custom support for your needs.

Davison Maintenance relates corrective work orders and preventive maintenance tasks to equipment components. Any combination of parts (stock inventory) are related to equipment, work orders, or preventive maintenance tasks by part group. Management reports accumulate costs and personnel hours in various formats or help organize personnel time.

Predictive maintenance is integrated to warn when equipment readings have exceeded an acceptable limit.

Equipment Units and Components

An equipment unit is a machine, building, vehicle, or any other entity managed like equipment.

Each equipment unit and can be divided into components. Components usually can be interchanged with other units. Do not confuse components with parts inventory. For example, an electric motor, a coupling, and a driven machine could be components of one equipment. An equipment unit could have several component records, each with the same unit code, but a different component code representing each component.

If you choose not to divide equipment into components, the equipment unit is represented in one component record by a unit code and blank component code. Parent-child relation is also available.

Work Orders

You can enter Corrective work orders for each component. A status of Working, Ready, Hold, or Completed is assigned plus a priority and a scheduled date. If needed there is room for several pages of work order description.

Work orders are sorted by:

- Work Order Number
- Type, Status, and Scheduled Date
- Unit Code
- Component Code
- Status, Priority, and Scheduled Date
- Personnel Assigned ID

- Parts inventory is integrated to work orders. When a work order is completed, parts are subtracted from inventory. You can list work orders that do not have enough parts.
- Individual man-hours are summed to the Actual Hours field. Man-hour costs are calculated from each personnel hourly cost.
- The program will number work orders automatically with a combination of letters and numbers.

Preventive Maintenance (PM)

Enter preventive maintenance (PM) tasks of different intervals and crafts by PM Group Code. You assign the PM group code to each component with identical PM requirements.

Creating PM tasks for equipment is easy with a Standard PM task utility that makes PM groups from component tasks. After you build component tasks, you only need to define the equipment and the program builds a group of PM tasks.

Enter a single date to set the PM schedule for each component. Otherwise PM can schedule by runtime hours, mileage, or from the date last closed. PM can schedule only during a season of the year if desired.

A part group can be assigned to the PM task. The parts are listed with the PM task.

Parts (Stock Inventory)

Parts inventory includes parts numbered by stock code and stock locations. Quantity and reorder points are maintained as parts are used from work orders.

Parts are grouped and assigned to equipment, work orders, and preventive maintenance tasks by the part group code. Each part can be assigned to more than one group.

A Vendor price is assigned to each part in a part group. Total costs for a part group are totaled to material cost in each work order when the work order is completed.

- Parts can be received and used by group in the part group window.
- Vendor part numbers are cross-referenced to your stock code.

Reports

Usually each new installation receives at least one custom management report and one custom work order listing in addition to the following reports.

- The Work Summary report accumulates personnel time. The cost summary report provides comparison between material costs and purchase cost for each equipment.
- The Equipment Summary Report combines Work Order, Preventive, and Material cost information for each component. Equipment is selected by a range (scope) of unit and component codes.
- The Sum of Estimated PM Hours lists weekly estimated PM man-hours for up to one year. You review the report for man-hour scheduling.

- The Inventory Lead Time report lists work orders with not enough parts. The reorder report lists parts that are below their reorder point.

PredictMate ™ - Predictive Maintenance

PredictMate reports readings that have exceeded an acceptable limit and indicate possible equipment failure. Anything measurable may be entered. The most common reading types are vibration, run-hour meter, and electrical readings. An x,y graph displays trends.

- Unnecessary readings are reduced, based on the amount of change.
- Readings are entered manually or imported from external sources.
- The Alarm Report lists equipment that have exceeded an acceptable limit.
- There is a forecast of when limits will be exceeded.

Crafts

A craft is a line of skilled work. For example, electrical, mechanical, instrumentation, carpentry, or operations are crafts in this system. Work is often delegated by craft. Preventive maintenance tasks are printed by location and craft.

Keep the number of crafts in this system to a minimum. The crafts that you enter into this system may not equate to work groups in your organization. Enter crafts as you want to divide both corrective and preventive tasks. Usually there are fewer crafts in this system than work groups in your organization. For example, tasks for Mechanical craft might be performed by personnel from a variety of job descriptions.

Hourly Cost: The hourly cost entered here is used in work orders as a default when no actual hours are entered for each person. See Personnel Hour Cost.

Contracted Services as Crafts

Add contracted services as a craft. Usually a contractor craft is not included in preventive maintenance (PM) tasks. You may wish to precede the code for a contract craft with tilde “~” to keep contractor crafts separated from crafts within your organization at the end of the craft list, for example, “~MECH” as “Mechanical Contractors”. See How to account Contractor costs.

Crafts Separated to Shifts

Shifts (for example 1st Shift: 8 am to 4 PM, 2nd Shift: 4 PM to 12 am) can be managed as Crafts in this system. When separated to shifts, Crafts can be coded like 1STMECH, 2NDMECH, 1STELEC, 2NDELEC to separate and sort work orders by shift.

Craft for shutdown periods can separate Preventive Maintenance tasks, like DOWN-ELEC, DOWN-MECH. This allows easy separation of PM tasks by craft for shut-down periods.

Personnel

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Add personnel initials or ID codes in this screen. The initials or codes you enter here are used for validation in other screens. Add a blank code if you wish to allow blank initials in other screens such as the work order input screen.
In a network a good ID code might be the USERNAME for each workstation login. Davison CMMS can retrieve the USERNAME for automatic login, for example, to Work Requests

Cost / Hour: Enter the hourly cost to multiply hour costs in work orders. See Personnel Hour Cost. Cost / Hour is intended as the total expense per hour for an employee, not just their personal pay rate.

Email address is used for emailing work orders or reports. When you select a person this email address is put in the “Send to” email address.

Productivity Report

Available hours for each person are compared to actual hours in work orders for the same person.

You are prompted for beginning and ending dates. Available hours within these dates for each person must be entered in "Personnel", "Hours Available".

For best accounting of Productivity, enter all personnel hours to the "Hours" related browser in Work Orders. Press "Hours". Otherwise, actual hours entered to the work order Actual Hours field are added to the Productivity Report assuming hours are performed by the Assigned person for the work order.

Weekly Hours

This report accumulates personnel hours from the “Hours” table that is related to work orders. It does not accumulate from the single hours field in work orders. The hours for each person are sub-totaled every 7 days after the beginning data as selected.

Available Hours

Available hours are the hours available for performing work. Actual hours are accounted in completed work orders. Available hours and Actual hours are compared in the Productivity report.

Enter Available hours for each personnel. You may enter the date as the ending date of an employee time period or daily time. The Productivity report sums the Available hours for a date range.

See Personnel Information about the Productivity Report.

Equipment Components

The Work Orders browser provides a simple Add/Edit of Corrective work orders for each equipment component. To enter more details for a work order, select "Go to this work order" from the

menu in the Work Orders browser. This jumps to where you can enter parts, personnel hours, and other details for the same work order.

Each unit can be divided into component parts. Components can be removed from the unit or shared with other units and usually have maintenance requirements similar to the same components of other units.

When a new unit is entered, a Component record with a blank component code (unit code + blank component code) is created for the new unit.

Handheld Tip: When entering equipment by handheld, the most simple entry is "Component Description" with no unit code. With this minimum entry the CMMS will create a sequential, numeric unit code and use the Component Description for Unit Description. Otherwise enter a unit in the unit popup for new equipment.

WARNING: Deleting a component deletes all the work orders related to the component (unit + component code).

When either a component code, unit code, or both are changed, work orders with the same component and unit code are also changed automatically.

Fields in the Data Window for Components

- Unit

If the code you enter is not in the Unit database a table of valid units displays, except when adding new equipment the unit description field is enabled and the new unit is added to the unit table in the background.

- Component

Each unit and component code combination must be unique. The component code can be used for classification of equipment, when classification is different from PM Group. Several windows sort on component code for grouping equipment by component.

- Size

This field is intended for values like 100 HP, 300 GPM, 150 cfm, or any value followed by a unit term. For example, to list only equipment greater than or equal to 50 HP:

  - Enter the HP to equipment like “50 HP”, or “100 HP”. You must enter “HP” after the number separated by a space.
  - Select Actions, Search or Filter, Size.

Enter ”>= 50 HP”.
Check “Tag each record” then press Search.

Only equipment with size >= 50 HP will be tagged. You can then run a report with only the tagged equipment.

- Priority: If priority is filled, work orders added from Equipment will default to this priority. You can also print preventive maintenance by priority.

- Location for component

The location of the unit is placed in this field by default. You can enter another valid location.

- Parts Group

Enter a valid parts group.

- PM Group

Enter a valid Preventive Maintenance (PM) group code. If the code you enter is not in the PM group database, a table of valid codes will display.

- PM Start Date

The PM Start Date is the beginning date of PM scheduling for the component. Calendar PM scheduling is calculated from this date. For example, a PM Start Date of 02/01/1999 will result in a 1YR (One Year) scheduled PM task on about 02/01 of each following year and a 180 day scheduled PM task on about 02/01 and 08/01 each year. The PM Start Date does not need to change each year; it can be changed to another date to change PM scheduling for a component.

- Route

Route codes are used mostly for preventive maintenance routes. You can print PM tasks by route code for a more specific route than is possible by Location Code. The “Component PM” (Scheduled PM) browser contains menu commands for creating route codes for many records.

- Reading

The current highest reading (miles, hours, or other) for this component. This reading field is updated from new work orders. The type of reading may by miles, hours, gallons, or other. This field is used for preventive maintenance tasks that are scheduled by a reading

- Unit is Out of Service

The "Out" column indicates the unit is out of service (OOS). Components within a unit are not separately tagged OOS. When the unit is OOS, all components of the unit are assumed to be OOS.

You can check the "Out" column to mark the Unit OOS without entering OOS date and time. In that case the Out column may not agree with the OOS dates that are related to the unit. To enter date and time press the "Out" button or the "Out of Service date" button in the Component info tab, which will change the latest record for Out of Service for the Unit.

If you enter an OOS beginning date, but leave the ending date empty, the "Out" column is marked.

If you enter a beginning date later than the latest ending date, a new record is added.

If you enter a beginning date and time earlier than the latest ending date and time, the latest OOS record is changed, but if a previous OOS record exists, the beginning date and time must be later than the previous ending date.

In the Units window you can change the OOS date and time for many units, review past OOS dates and times, or run the OOS Work Summary report.

- Notes and Nameplates

The "Notes" field is for miscellaneous comments about this component. Nameplate information specific to this component can be entered in the Notes. Do NOT use this field for work completed on the component. Instead make work orders for the component.

You can make various nameplate templates with any text editor with no formatting characters like Windows NotePad. Paste the template from the Windows clipboard to a note field.

- Schedule Type

Schedule Type is "T" or "C" for Time or Calendar. The default entry is "C" (Calendar).

- Vendor code:

The vendor code relates the component to the Vendor database.

- Purchase date: Date that the component was purchased.
- Purchase cost: Initial cost of component.
- Warranty date:
  The date the component's warranty is expired. When work orders are entered for the component, the warranty date is checked. The warranty date will display on the work order if the work order scheduled date is earlier than the warranty date.

Unit Information

A Unit is a complete machine or other equipment entity such as part of a building or a vehicle. A unit can be divided into component parts, like Driver and Driven, for example, an electric motor and a fan are separate components of the fan unit.

Out of Service

A unit is usually Out of Service (OOS) when it needs repair or does not need to operate. When repair is needed, OOS causes production down time and is not a scheduled shut-down period. Preventive maintenance tasks will not schedule when a unit is OOS. The Out of Service report summarizes down time from each period when equipment units where OOS.

Units may go in and out of service, so each unit relates to the OOS table of beginning and ending dates and times. The Out of service checkmark is loosely related to the OOS table. You can check a unit as out of service without adding records to the OOS table. When you add or edit the latest record in the OOS table, the OOS checkmark is changed. The Out column is checked if the OOS ending date is empty.

The "Change All..." command prompts for changing OOS dates and times in many units. See Actions, Change All, Out of Service. Beginning or ending date is changed according to the same rules when entering dates and times for each unit. This utility stops when a beginning or ending date and time does not agree with a rule.

Out of Service Work Summary

Work orders opened and completed within the OOS period are summarized for the costs listed in the OOS report. Preventive Maintenance work orders completed during a shut-down period are not included in the costs of the OOS report. Work orders opened to fix OOS conditions should have a Requested date and time the same or later than the OOS beginning date and time, and a completed work order date and time earlier or the same as the OOS ending. For a complete account of costs, run the OOS Work Summary report after OOS ending dates and times are entered and work orders for the OOS are closed.

The OOS report shows the time equipment was OOS in days, hours, and minutes. If work order cost is included, the time required to complete the work order (Requested to Completed) is shown as “Completed” days, hours, and minutes. The time between work order completion and OOS ending (in service) is shown as “Completed to End”.

In the Equipment Components window you can add work orders for OOS and enter OOS date and time. See Unit is Out of Service.

NOTE:

- When a new unit is entered, a Component record with a blank component code is created for the new unit.
- When you enter a location code, all component records with a blank location code are changed to the new location code.

WARNING:

- Deleting a unit deletes all the information related to the unit, including components, and work orders.
- When a unit code is changed, components and work orders with the same unit code are also changed automatically.

Locations

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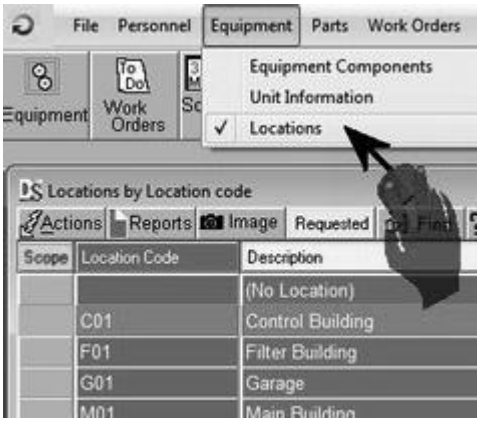
Locations indicate where the unit or component is installed. Units or components can be sorted by location.

If a location is changed here, the same location code is changed in Unit and Component data. Locations deleted here will not delete information elsewhere.

The location code represents an area in a facility, often location codes show sub-areas, like "LOC01", "LOC02",....



The location windows in PredictMate ® and Shaft Alignment are simple. The CMMS shows the requested column.

Requested

This field controls what locations are displayed in the Work Order Requests by Location window.
If any locations are checked, only those checked locations display to users in work order request windows.

Location, Unit, and Component Codes

Location and Unit codes should not be identical. A unit can move to another location and keep the same unit code. Locations are not the parent of a parent-child relationship

Work Orders

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Grouping Work Orders

To find groups of work orders like Active or Closed, select a group from Find >> Group Work Orders .... A scope of work orders is marked. For example, the “Active Work Orders” group will mark all corrective work orders where status is Working, Ready, or Project.

Work Order Number:

Each work order number must be unique. The Work Order Number is actually a code that can contain letters and numbers.
To find a work order with no leading zeros, press <space> once, then the work order code.

Automatic Work Order Numbering

The following actions apply when saving a work order number:

- An empty work order number is filled with the next greater work order number.
- If beginning with a letter, spaces after the letter are filled with the next greater number. For example “A” would be changed to “A000000002” if a work order number “A000000001” already exists.
- If beginning with a digit or a space the remaing code is right-justified. For example “123 ” is changed to “ 123” and “ AA “ is changed to “ AA”.

Leave the work order number blank for automatic numbering. The program finds the highest work order number (not preceded by a letter, like 0000000998), then creates a number that is one greater (like 0000000999). You can find the greatest work order number by searching the colon character (:). Select Actions, Find, then enter “:”.

Sometimes work order numbers that have been manually entered cause the automatic numbering to create a different number than expected. To correct this, find the work order number and insert leading zeros or correct it so that it is only one greater than the previous work order number. To correct many work order numbers, select “Actions, Create codes – WO Number”.

Numbers are incremented after leading letters in a work order code. For example, if you enter "AB" the work order number is incremented to one greater than the highest work order number that begins with "AB". Override automatic numbering by entering an entire code with no trailing spaces.

To see what the program will create for the next work order number, add a new work order (Actions, Add), then click the check button. The automatic work order number will appear. You can Cancel the work order.

Requested Work Orders

People who only need to request work orders use the "Requested" window. Select the menu option "Work Orders, Requested".

You can give certain users a shortcut for only Work Requests. These shortcuts exist in a folder ...\DMSystem\Shortcuts\Other_Access.

Work Order Archiving

You may want to remove (archive) old work orders. Usually work orders older than two years are archived. Work order archive is selected from "Actions >> Export/Import >> Archive Work Orders". User level 7 is required to archive. Work orders are copied to comma-separated (.CSV) files for compatibility with any future system. Three tables are archived: Work Orders in Old_Work.csv, personnel hours in Old_Hour.csv, and work order costs (not part groups) in Old_WoCt.csv.

Before archiving work orders

Backup all data. Select "File >> Backup >> Backup"
Pack data, at least work orders. Archived work orders are deleted. Packing data before archiving removes all pre-existing deleted records and allows recovery from an aborted or reversed archive easier. See "File >> Index >> Pack...".

Archive options

Delete each work order is the default. If this is unchecked work order information is not removed, but only copied to the archive file.

You can select Corrective or Preventive work orders. If only Preventive work orders are selected, the last Preventive work order is not removed to keep the current PM scheduling.

Work orders later than the latest date remain. Some Preventive work orders older (earlier) than the latest date may remain.

Preventive Work Orders

Preventive Maintenance (PM) work orders are automatically created in Component Preventive Maintenance with a work order number beginning with “Z” followed by a number one greater than the last PM work order number.

Preventive Type work orders are added in Component Preventive Maintenance for a record of completed PM, for adding extra comments, and adding individual personnel hours to PM. **Preventive work orders are added only in Preventive Maintenance.**

Closing a work order

Press the Close button to close a work order. This will put today’s date to the Completed Date field and “Complete” to status. NOTE: The browser returns to the previous position, usually on the next “Open” work order. To close many work orders, tag the records to be closed before pressing the Close button.

To open a work order that was closed (Complete status), select “Actions, Close/Re-open …, Re-Open…”. This changes the status to “Ready” and the completed date to blank. To re-open many work orders, tag the records to be opened before selecting this..

Tip: To find the latest closed work orders, change the sort order to “Date”, then scroll to the bottom row. Also right-click, “Return to previous” can return to the latest closed work order after the “Close” button is pressed.

In some cases the work order is approved after it is closed. Use the "Approved by" field for this purpose. To find completed work orders as Approved or not, select "Actions, Group work orders ..., Closed work orders...". You will be prompted for "Yes" or "No" approved work orders. The report "Closed work orders (Corrective)..." shows the same prompt for limiting the work order list to approved or not.

Images (Pictures) for Work Orders

Images transfer to handheld and can print in work orders. If an image exists named “WorkOrder_<number>.JPG”, it is used for the work order. Otherwise the equipment component image is displayed.

To edit an image for work order instructions, work order images are copied from equipment images or selected. In the Work Order window, press “WO Image” from the work order image viewer, and you are prompted to copy the image to an image for this work order, named “WorkOrder_<number>.JPG”. Then you can edit the file “WorkOrder_<number>.JPG” specifically for this work order.

External Work Orders

You can add work orders from external systems by importing a text file (comma-separated .CSV or tab-delimited .TXT). Select “Actions >> Export / Import >> Add External Work Orders”.

The text file must be named “Ext_Work.csv” or at least include “Ext_Work” within the file name like “Ext_Work from Predictive.csv”. Work order number is created automatically. Minimum required fields in the text file are:

Eq_Code, Comp_Code, Cause, Da_Sched, Time_Sched, Notes

These fields contain Equipment code, optional Component code, cause code, Scheduled date, scheduled time, notes describing work.

External work orders are added uniquely by Cause + Eq_Code + Comp_Code + Scheduled Date + Time. If an open work order of the same Cause + Eq_Code + Comp_Code exists the external work order is not added. This avoids adding the same external work order more than once.

Status

Work order status is a variation of either “Open” or “Closed”. Work order status is considered open or closed as follows:

Open: Working, Ready, Project, Hold

Closed: Declined, Completed

For simple use, work order status can just be *Ready* for Open and *Completed* when Closed.

Status is W, R, P, H, D, or C for Working, Ready/Requested, Project, Hold, Declined, or Completed. Status is sorted in descending order with “W” first and “C” last. When you select a "C" or “D” status the Date Completed will automatically be filled with the current date. You may type in a different date. When you enter a completed date, the status will automatically be changed to "C" for completed.

Some users may enter work orders that are later considered invalid. When a “Requested” work order is invalid, change the status to “Declined”. Declined work orders are not included in management reports. Declined work orders should have no hours or costs.

Days, Interval, and Reading pertain to type Preventive work orders only. They are used the same as in the PM Task Entry screen.

Days: The number of days or years between the PM task.

Interval: The interval if a run-hour or mileage meter is read to schedule preventive maintenance.

Reading: The meter reading at the time the PM work order was completed.

Work Order Date Column

This Date is displayed and sorted according to Status by the following rules.

If Status is Completed or Declined, Completed Date.
Else if Scheduled Date is not blank, Scheduled Date.
Else Requested Date.

Dates - Rules for Corrective (CM) or Preventive (PM)

- Requested:
  CM: This is filled when a work order is created, but can change.
  PM: Blank is acceptable. If a Ready PM work order, the date the Ready PM was created.
- Scheduled:
  CM: This date can schedule work orders ahead or priority 1-9 by using the Date Priority.
  PM: This date is filled with the past date that the PM task became due.
  The Scheduled date that is displayed in PM Tasks is a calculated future scheduled date.
- Due Date:
  CM: This date is used in the Plan Chart and in some work order job forms.
  PM: Only filled when Ready PM work orders are created with the Due PM date in PM Setup.
- Completed: CM and PM: The date the work was completed or declined.
- Warranty: The equipment warranty date will display in red if the work order scheduled date is earlier than the warranty date for the component.

Time: These work order dates have a time: Requested, Scheduled, Completed.

Estimated and Actual Hours

In Preventive work orders, this is filled from the PM task. You may enter the estimated hours for planning purposes and management reports.

Personnel Hour Cost in work orders

See Personnel Hour Cost.

Material Cost

After saving work order information part costs are summed to the material cost field. If a part group is assigned, the cost for each part in the group is summed and placed in the Material Cost field. Part cost is obtained from the vendor price that is assigned to each part.

Parts for work orders and the Parts Group

You can add parts for this work order after saving a new record. Parts are summed to the work order when you “Save” any change to this work order.

You can add parts for only this work order or assign a part group to the work order. If you add parts for this work order, the work order number is added to the Parts Group field automatically. You can put other work order numbers in the Parts Group field, which allows duplicating parts among work orders without creating a parts group.

Part groups are removed from inventory when closing a work order. You can limit the parts that are removed by tagging only the parts to be removed before closing the work order as shown. You can un-do this by selecting "Actions, Replace parts that were removed." Total cost is summed the same.

A PDF File (*.PDF) of parts can be associated to the equipment for this work order. The PDF file spec is stored in the Notes for the equipment. The location of PDF files is usually in the current data directory in a folder named PDF or as assigned by the variable PDFPathEqpPart=<folder>.

Additional Costs

Additional costs are material costs or services not in inventory. Usually additional cost items are purchased only for the work order. Additional costs may also account contracted services.

Craft is validated against the Craft database. Another term for Craft is Trade, for example, Electricians, Operations, Instrumentation, and Safety.

Work Description

Try to put the most descriptive terms on the first line. The first line may be displayed on some work order browsers and reports. If the work order type is "P" for Preventive, the PM task is not copied to the Work Description.

Only when adding a new work order, an initial message can insert automatically. Enter this note from the Work Orders menu: "Work Orders, Initial comment".

How to account Contractor costs

Account contractor costs for equipment by work orders. In a work order you can account hours and material costs from the contractor. If the contractor cost is a lump sum without detail, enter the lump sum to Additional Costs for the work order. Accounting costs by work order and craft works best with reports for equipment. Contracted services are separated without making the system too complicated.

a) Add a Contractor craft in Personnel, Craft Information. You may only need to enter one craft: "Contracted Services".

b) Enter the contractor as a vendor in Parts, Vendor Information.

c) Add the work order for contractors:

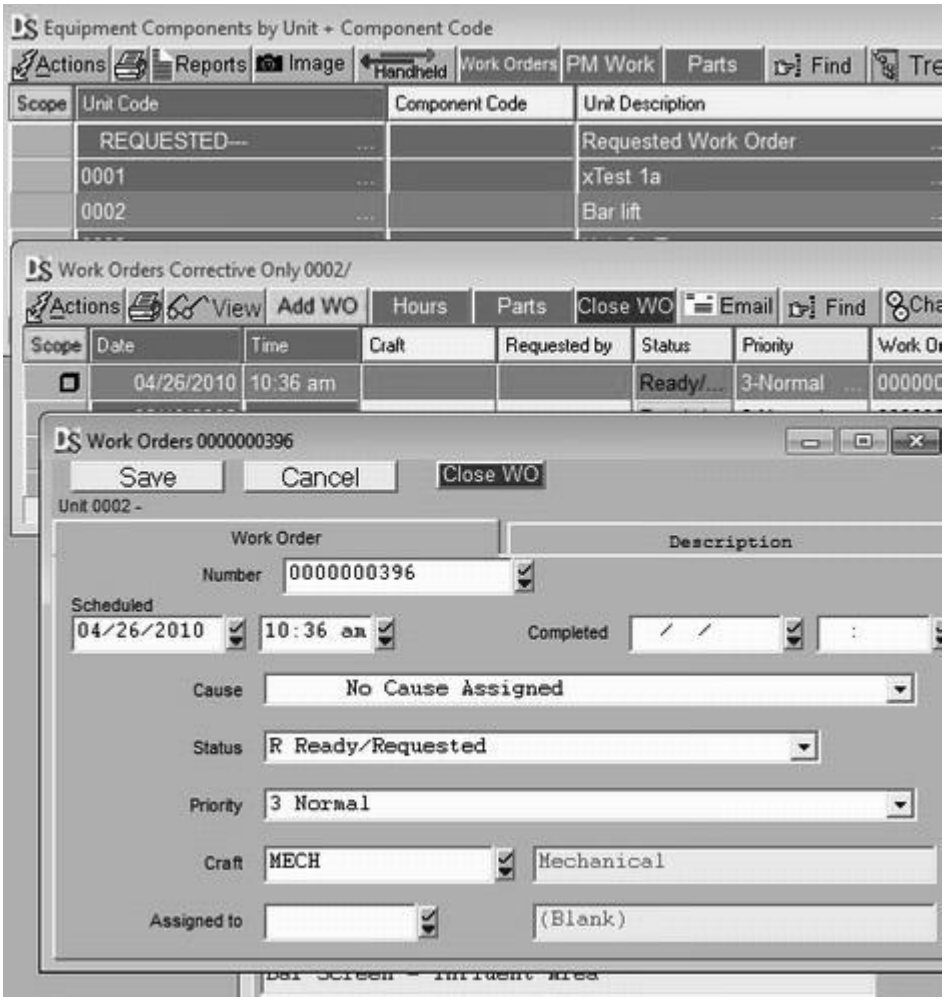
1) Add a work order for the contractor craft.

2) Enter a work order number that begins with letters. The letters should identify work done by contractors, for example: "C00055" for Contractors.

Tip: If you enter only "C" as a beginning character for work order number, the next number available for work order numbers beginning "C" is added automatically.

The Work Order window with Equipment Components allows easier management of work orders for adding work orders and changing the status. The date and time on the left side of the window fills both Requested and Scheduled date and time. This window has similar function to the Requested Work Order window.

To enter personnel hours press the "Hours" button. To enter more details, select "Actions, Go to this work order". This will open the main work order window with this work order selected, but only if your rights are enabled for the main work order window.



Parts for work orders and the Parts Group

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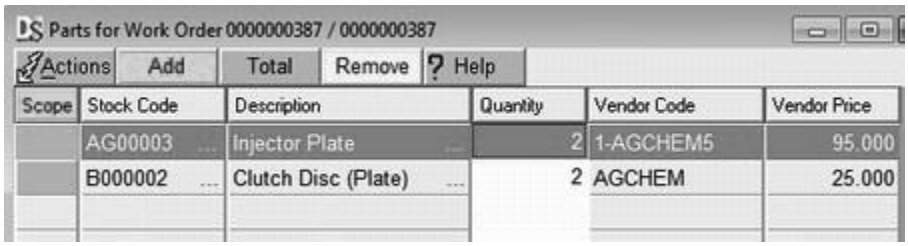
You can add parts for this work order after saving a new record. Parts are summed to the work order when you "Save" any change to this work order.

You can add parts for only this work order or assign a part group to the work order. If you add parts for this work order, the work order number is added to the Parts Group field automatically. You can put other work order numbers in the Parts Group field, which allows duplicating parts among work orders without creating a parts group.

Part groups are removed from inventory when closing a work order. You can limit the parts that are removed by tagging only the parts to be removed before closing the work order as shown. You can un-do this by selecting "Actions, Replace parts that were removed." Total cost is summed the same.

A PDF File (*.PDF) of parts can be associated to the equipment for this work order. The PDF file spec is stored in the Notes for the equipment. The location of PDF files is usually in the current data directory in a folder named PDF or as assigned by the variable PDFPathEqpPart=<folder>.



Work Priorities

Priorities are commonly 1, 2, 3, 4, 5, or Date. You can change these priorities. Priority 1 is emergency. Try to assign priority 1 for emergencies only. Too many high priority work orders can cause confusion.

The Date priority is used when the Scheduled Date is most important in a corrective work order. This is not scheduled preventive maintenance, but a work order with a deadline, which is the Scheduled Date. To view work orders by date priority, sort on Priority, then type "D" or find (Ctrl-F) the first work order with "D"ate priority. Open work orders are sorted by Scheduled Date within the Date priority.

Where parts inventory is not current, you can use a “P” for “Parts Needed” or “Delayed for Parts”. Sorting by priority and searching for “P” will display all open work orders that are delayed for parts.

Davison Maintenance does not automatically remind you of corrective work orders that are past their deadline (Scheduled Date). However, you can print the report for "Active Work Orders by Date Priority and Scheduled Date". If you need an automatic reminder for certain activities, several inexpensive popup calendars are available for the Windows (tm) desktop.

Work Cause

Cause codes are often described like “Normal Wear” or “Excessive Heat”. Do not use cause codes to indicate Corrective or Preventive Maintenance. Cause codes often provide a key for management reports.

Requested Work Orders

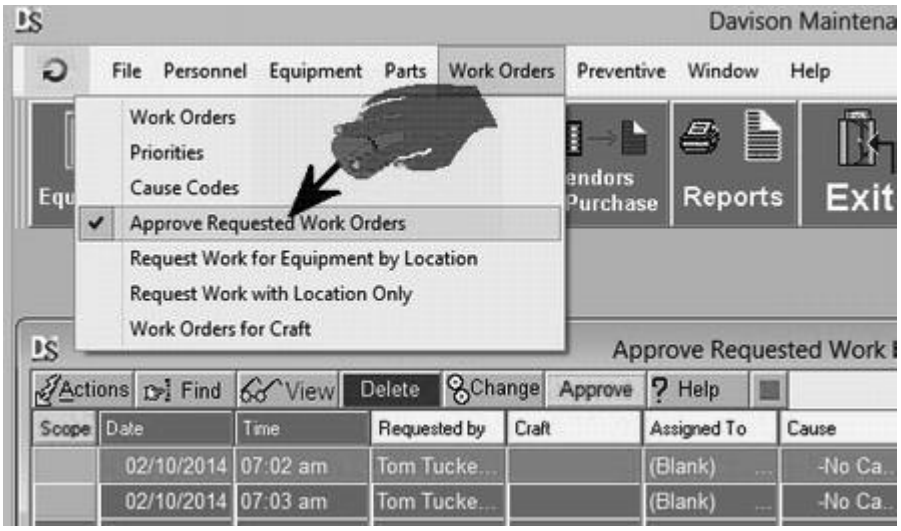
February 2014

www.DavisonSoftware.com

The "Approve Requested Work Orders" work order window shows requested work. This table does NOT contain work orders. The work requests are moved to work orders if approved.

This work order window is for handling incoming work requests. Only maintenance managers with work order privileges can open this window.

Press the “Change” button to change work orders to another equipment.


Davison Maintena
File Personnel Equipment Parts Work Orders Preventive Window Help
Work Orders
Priorities
Cause Codes
Approve Requested Work Orders
Request Work for Equipment by Location
Request Work with Location Only
Work Orders for Craft
Reports
Exit
Approve Requested Work
Actions Find View Delete Change Approve Help
Scope Date Time Requested by Craft Assigned To Cause
02/10/2014 07:02 am Tom Tucke... (Blank) -No Ca..
02/10/2014 07:03 am Tom Tucke... (Blank) -No Ca..

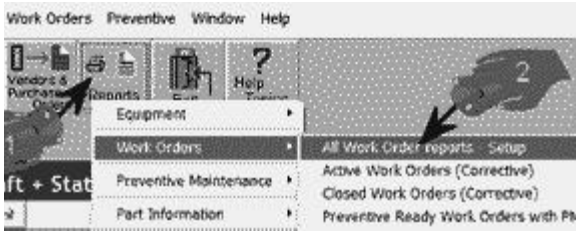
If you tag work order records before pressing “Change”, all the tagged work orders will be moved to the equipment that you select.

Delete or Approve requests.

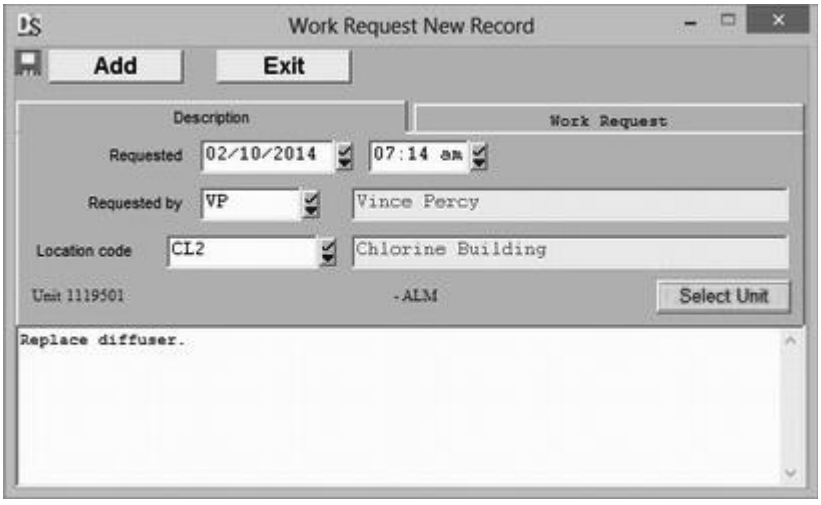
An approved request is moved to the work order window.

Find your approved requests in the work order window by selecting "Find, Approved - Tag" in the work order window.

A requester can print work orders from the “Reports” button. This allows printing work orders sorted by Craft, Status, Priority, or other selection. The "Active Work Orders" report prompts for oldest date, priority, and craft.

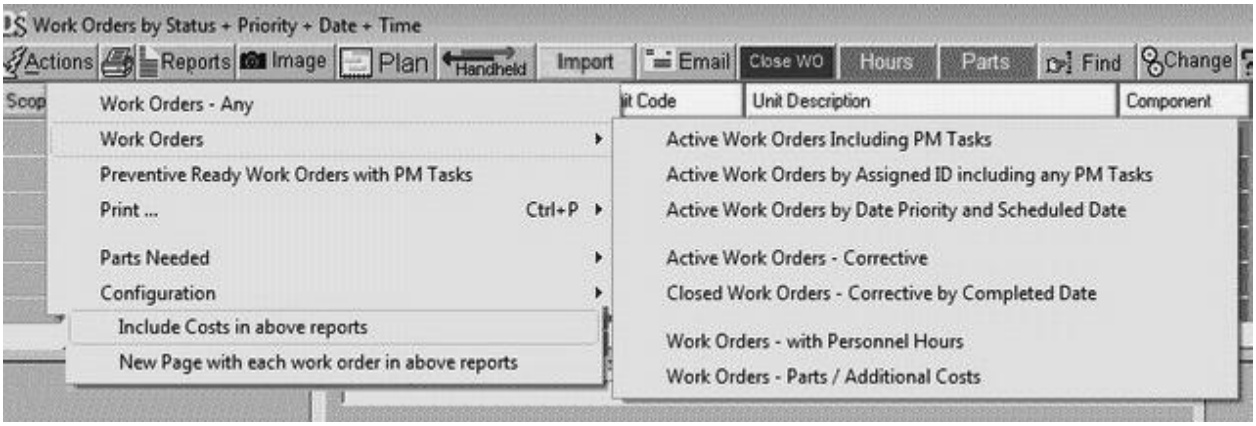


See the “Work Request...” shortcuts in C:\DMSystem\Shortcuts\Other_Access\ to allow only access limited to the request window from a users desktop.



Work Order Reports

Note: Click “Include Costs...” in the Reports menu to include cost information in most work order reports. The check mark indicates that costs will be included.



- Active Work Orders

Active work orders are automatically sorted by status and priority to only Working, Ready, and Project status, unless you have already done this. If you tag records with no scope the report will run for only the tagged records. This report prints only Corrective work orders.

You can print active work orders from a scheduler or shortcut with this run command: "c:\dmsystem\MipWin.exe WORKPRNT". The windows default printer is used without prompting the user.

You can select active work orders for immediate printing with this run command: "c:\dmsystem\MipWin.exe WORKSLCT". This is intended for use in a shortcut for technicians. See the "Active Work Orders" shortcut in c:\dmsystem\Shortcuts. Variations on the format and query are possible setting the configuration to an optional report, ActiveWORpt=<ReportName>.

You can add Ready PM work orders from condition-directed (“CD “) tasks with this run command: "c:\dmsystem\MipWin.exe WORKCDPM". This can be called from a scheduler for automatic notification with suggested work as entered in the PM task.

- Active (or Preventive) Work Orders Including PM Tasks

Preventive maintenance (PM) tasks, including standard PM tasks, are included with the work order description for Preventive work orders. Other work order listings do not include PM tasks.

You can print *completed* Preventive work orders including PM tasks by setting a scope or tagging the *completed* Preventive work orders before selecting this report. This report is printed often for inspections or other cases where PM tasks must print repeatedly.

- Active Work Orders by Assigned ID

Print only active (Working, Ready, and Project status) work orders by Assigned ID.

- Preventive Ready Work Orders with PM Tasks

Preventive work orders list by scheduled date. These are only PM Ready work orders that were added by pressing

in Component PM.

- Work Orders as Selected

This selection prints work orders with all possible information.

- Work Orders – Parts / Additional Costs

This selection prints parts or additional costs (parts not included in inventory or other costs) relative to

every work order. The option “Part and Addl Cost – Totals” is intended only for Active work orders as a list of all parts needed.

- Custom Work Orders

Several custom work orders may be added to the Reports menu, different at each installation of this application. Press

for custom work orders.

- Work Orders with insufficient parts

This report lists corrective work orders with parts that are not in stock, or the part reorder time is beyond the scheduled date of the work order. The quantity of parts in inventory is insufficient when there is not enough parts for the work order plus the quantity needed for previous work orders. Work orders are considered depending on sort order and scope.

You should not include "Completed" work orders in this report.

For intended results, sort by "Status + Prioriy + Date" and select a scope from top to the last incomplete work order (not including "Completed" work orders).

IF you sort work orders by "Status + Prioriy + Date", higher priority work orders get the parts first. Work orders must have a parts group code assigned to be considered.

Parts Needed by Stock Code

After running the report for insufficient parts run this report to see the total of each part needed.

Insufficient Parts for Preventive Maintenance Tasks

To list Preventive Maintenance tasks with parts that are not in stock you must add “Ready” Preventive work orders before running this report. See *Scheduled PM, Actions, Create Ready Work Orders*. Be careful that the PM Setup is correct.

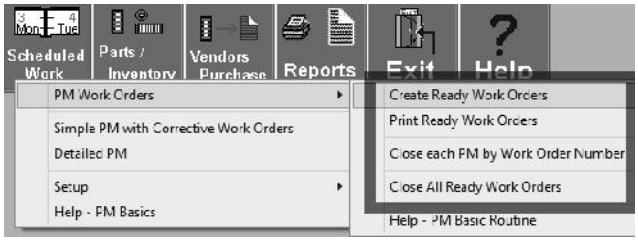
Preventive Maintenance Scheduling Basics

April 2015

www.DavisonSoftware.com

Weekly routine for Preventive Maintenance

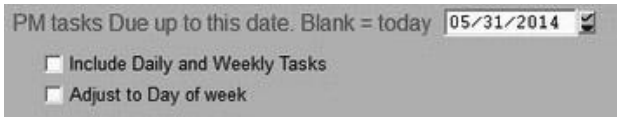
The PM Work Orders menu is a simple weekly routine.



1. Create Ready Work Orders
   Creates new PM work orders that are due.
2. Print Ready Work Orders
   Print the new work orders.
3. Close each PM ...
   Opens the work order window to Close each PM.

OR

3. Close All Ready Work Orders
   This is the easiest command to close all PM work orders.



Monthly Routine - Setup Options

Monthly scheduling is the same, except:

- Enter the last day of the month to Due Date.
- Set all PM Start dates to the last day of month.
- Do NOT check “Adjust to Day of Week”.

For more options: Open the Simple or Detailed windows.

Preventive Maintenance (PM) Group

Equipment Components with identical PM get the same PM group code.

Calendar Scheduling

The PM Start date:
- is the beginning date of PM for the component.
- is the central date for Calendar scheduling.
- does not need to be changed each year.
- you might change the month and day of equipment PM Start dates.
- If monthly scheduling, set to the last day of month (Jan 31, Feb 28, Mar 31, ...)

You do not need to change the PM Start date from one year to the next.
You may want to change the month and day so that not all components schedule during the same week.

Example Calendar PM scheduling with a PM Start date of 02/28/????:

Frequency	PM Scheduled Dates (mm/dd)
30-Day	01/31, 02/28, 03/31, 04/30 ...
90-Day	02/28, 05/31, 08/31, 11/30
180-Day	02/28, 08/31
1YR	02/28

Time Scheduling

Time scheduled PM is due strictly by the number of days since the last closed PM.

Calendar scheduling sets an even number of PM hours from week to week.
Time scheduling might result in uneven PM hours from week to week.

Due PM List
- A dispatch list of PM tasks for equipment, not yet work orders.
- When the task is closed, the program adds a work order as history.

Ready Work Orders
- PM work orders of the same PM tasks not yet closed, Ready status.

PM tasks are Due when the Due date is on or after the Scheduled Date.
If you schedule/print PM once per month, enter the last day of the month to due date and closing date.
To get a report of current PM Tasks:
- Print Due PM Tasks.

or
- Print Ready Work Orders of PM Tasks.

Component Preventive Maintenance

PM tasks are usually printed from this application each week. Accounting Daily PM tasks on a daily basis is not recommended. Daily PM is usually accounted on a weekly basis. Tasks of less than annual frequency will schedule according to the day of the week, which allows daily scheduling where PM is printed daily.

The Due Preventive Maintenance listing is a dispatch list, not work orders. When you close each PM task printed in this listing, then a Completed work order is created.

The **PM Start Date** applies only to Calendar-scheduling. It can be changed for each component. The month and day of the PM Start date is the central date for Calendar-scheduling of all frequencies less than one year (Daily through 180-day). Calendar-scheduling is adjusted to the same day-of-week as the PM Start Date.

How to distribute, then close completed PM tasks:

1. Press

to set PM Printing options. See PM Printing and Scheduling Options

2. A. Press

then select “List Due Preventive Maintenance” to print PM tasks. See Reports for Component Preventive Maintenance

2. B. Alternatively you can export PM tasks to a handheld

.

3. After the PM tasks are completed by personnel, close PM tasks:

If you have exported PM tasks to a handheld the following steps are **not** needed. When you run “Close PM Tasks from handheld”, all completed PM marked as done on the handheld will close due PM as needed. If the task is not marked as done on the handheld, comments or actual personnel hours are added to a “Ready” status PM work order. A reading for a component is put to the component reading.

Steps requred if PM tasks were printed (not for handheld):

a. Press

. Check that PM Printing and Scheduling options are the same as the heading of the printed PM tasks.
b. Press Next Due to find the next equipment component with PM Due.
c. Press Close Tasks to close all PM tasks.

Build, then schedule PM tasks as follows:

1. Enter PM tasks from the menu: *Preventive, PM Task Setup*.
Optionally you may first add valid group codes from the menu *Preventive, PM Groups*, but PM groups can be added in *PM Task Setup*.

2. Assign PM group codes to components. Components with identical PM get the same PM group code.

3. For Calendar scheduling, assign a PM Start Date to the component. The PM Start date:

- is the **beginning** date of PM for the component.

is the central date for Calendar scheduling

- does **not** need to be changed each year.

Month and day can be changed sometimes to balance scheduled PM.

The PM Start Date is **not** changed except if you need to change the month and day that PM tasks are scheduled. You do not need to change the PM Start date from one year to the next. You may need to change the month and day of this date so that PM tasks for many components with a PM Start Date of the same month and day do not schedule during the same week.

You can assign both the PM Group code and the PM Start Date from *Scheduled PM, Actions, Edit* .

Example calendar PM scheduling with a PM Start date of 02/01/????:

Frequency	PM Scheduled Dates (mm/dd)
30-Day	01/01, 02/01, 03/01, 04/01 ...
90-Day	02/01, 05/01, 08/01, 11/01
180-Day	02/01, 08/01
1YR	02/01

PM scheduled dates are adjusted to the same day-of-week as the PM start date in the component, except for annual or greater frequency.

4. Print PM tasks from "Component PM". Press

to print for certain crafts or a PM Due date that is different than today. Press the reports button

to print PM tasks.

Check the *No* column for no PM scheduling for a component. If the *Out* (Unit Out of Service) column is not checked, then only the components checked in the *No* column are omitted from scheduling. This is intended for spare components that do not need preventive maintenance.

Closing PM Tasks

If you have exported PM tasks to a handheld

the following steps are **not** needed. When you run “Completed tasks from handheld”, all completed PM marked as done on the handheld will close due PM as needed. The setup options are stored on the handheld. Current setup options displayed from

will not apply to the handheld when closing PM tasks.

If you do not use a handheld for Scheduled PM:

After preventive maintenance (PM) tasks are finished by personnel, you must close PM tasks. Referring to the printed PM tasks, close tasks that were finished by personnel.

Press

to to find certain crafts or a PM Due date that is different than today. When closing PM setup a PM Due date that equals the date when you printed the PM tasks.

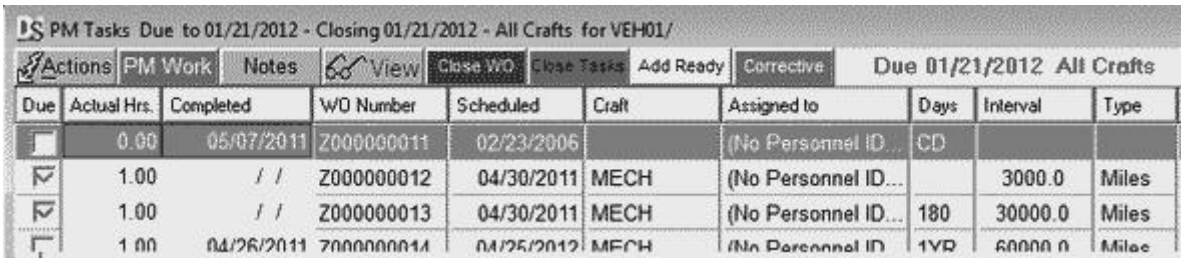
Always setup the PM Print Options the same as when you printed the PM tasks.

See the header of the printed PM tasks for setup options. For example a header that reads: “PM Due on 03/16/2001 for All Crafts by Location” means that you must set the PM Due date to 03/16/2001, check All Crafts, and sort the Component PM browser by Location.

If you printed PM by Assigned ID or Equipment Priority, filter by each Assigned ID or Equipment Priority shown on the printout as you close PM.

To close a PM task, click on the checkmark in “PM Tasks” in Component PM. The checkmark indicates that the task is due. An indicates that the task is on Hold or Declined. You can

re-open the task by clicking again on the checkmark.



When each PM task is closed a "Preventive" type work order of "Completed" status is created by the program.

Closing All PM with a single command

You can close all due PM with one command. Be careful. To close all PM with one command, select from Component PM: *Actions, Close all PM or Create Ready Work Orders, Close all PM*. You can set a scope or tag records to close PM only within the scope or tags.

If you have closed all PM mistakenly it can be reversed (re-opened) with this command: *Actions, Close all PM or Create Ready Work Orders, Re-open closed PM for current closing date*.

Finding Components with PM tasks

The following commands for next or previous *due* PM are limited to a scope or tagged records, if you set a scope or tags. Commands for PM tasks, due or not due, are not affected by scope or tagged records.

- Press **Next Due** (or F8) for the program to find the next component where PM is due.
- Press **Prev Due** to find the previous due PM.

Closing PM that was done in past weeks

If you get behind in closing PM that was done in previous weeks, you may need to follow this procedure.

1. Set the PM Due date starting with the earliest week. Press **Setup** to set the PM Due date.
2. Now pressing **Next Due** will search only for PM that was due up to that PM date.
3. Close PM as indicated according to the PM Due date.
4. After all PM is closed, set the PM Due date (and PM Close date) to the next week, move to the top, and press **Next Due** again.

PM Tasks window

The PM Tasks window displays PM tasks for the component. Tasks are ordered by Craft, Frequency, and Mile or Hour limit (Interval). A checkmark indicates that the PM tasks are due.

The "Scheduled" date indicates:
- the date that the PM task for the component **became** due IF the PM task is due.
- the date that the PM task for the component **will be** due IF the PM task is not due.

PM Ready Work Orders

A Completed PM work order is added each time a PM task is closed. Ready PM work orders are added

only for special circumstances:

- PM Due Report is not printed. Personnel do not use the Scheduled PM window.

If the PM Due Report is not printed, personnel work on Ready PM work orders and complete the PM Ready work orders from the work order window. This allows users to access one window for completing both Corrective and Preventive work orders without training about the difference between Corrective and Preventive work.

You can add many PM Ready work orders with this procedure from the Scheduled PM window:

1) Enter the PM Due date in PM Setup, or the PM Due Date can be blank for simple scheduling of PM Due to the current date.
2) Tag equipment to be worked on. This is optional for creating fewer Ready PM Work Orders.
3) Select "Actions > Close all PM or Create Ready Work Orders > Create Ready PM ...".

- Adding special notes for a component PM

Edit the work order from “PM Work Orders for...”. Add special notes in the “Extra Comments”. These comments will print in addition to the PM task only for this component.

- Special, one-time scheduling or postponing a PM task

You can put a future Scheduled date. This PM task will not become due until that date. You might prefer to change the status on postponed PM work orders to “Project”. This will not change the scheduling, and will keep the work order separate from other active work orders.

You can put Hold status to delay a task indefinitely. You can put Declined status when the task in this PM group should never be scheduled for only this component. An indicates that the task is on Hold or Declined.

- Partial completion of PM tasks

When part of a PM task is completed, you may want to show the task as completed and make a status Ready work order for the remaining part of the PM task. Enter a note about what needs to be done for the PM task in the Description for this work order.

- Ready PM work orders in the active work order list.

Ready PM work orders appear in the active work order list. This puts priority on the Ready work orders when they are listed in the Active Work Order list.

How to add a Ready work order:

1. Press

to add a PM work order with Ready status (and no completion date).
2. You may need to change the Scheduled Date. PM will schedule next according to this date until this work order is completed.

Priority of PM tasks

- Set the Equipment Priority in the Equipment window. You can filter or tag by priority or print Due PM by priority.

- For one-time priority:

-- Tag records in the Component PM browser. Only tagged components will print.

-- Print Ready PM work orders as follows.

a) Add a ready PM work order by pressing

. You could also change the priority in the ready work order. You can set the default priority for Ready PM work orders in PM Printing and Scheduling Options.

b) Print the PM tasks from the report for Open Preventive Work Orders
Print one of the reports entitled "… by Priority".

- Change the sort order of Components to provide the priority needed. For example sorting on Components or PM Groups, then selecting a scope of components in that order.

- Indicate priority by Route code. Since Route is intended as the order for personnel to walk through the facility, it is also the priority in which PM tasks are completed. Route codes like "AA0001, AA0002" and "AB0001, AB0002" indicate different routes (and priority).

- For priority of random equipment every week:
  a) Tag the equipment records in the "Component PM..." data browser *in the order that you want the PM to print*. This could be an odd order, regardless of any sort order.

b) Save the tags to file. You can select "Save tags to file." from the Tag / Scope menu.
c) Print the "List PM Due" report.
d) Later, when you close the PM tasks, restore the tags from file and move from one tagged component to the next with the "Next tag" command (Ctrl-N).

NOTE: If the equipment database is packed after tagging, old tags to file will not relate correctly.

Dates for PM Scheduling

- PM Start Date

The beginning date of PM scheduling for a component. Calendar PM scheduling is calculated from this date. Each component has a PM Start Date. This date is entered when a component is added to this system and not changed unless calendar PM scheduling for the component needs shifting to other weeks.

After running the "Year Schedule Hours" report, you may want to change this date for some components to make a better balance of PM scheduling through the year. In this case you only change the month and day of the PM Start Date. Leave the year the same as the original.

- PM Due Date (PM Calendar-Scheduled Date)

The date from which PM tasks are scheduled. By default, the PM Due Date is the current date. You can change this date in the PM Print Options. Press

- Default Closing Date for PM

This date is put into the Completion date for a work order when a PM work order is closed. This date is changed in the PM Print Options.

- Work Order Scheduled Date (PM or Corrective)

In the "Component PM" window, where PM is closed, this is the date that the PM task became due for the component.

- Seasonal Month/Day

In the PM Tasks window this designates a season or date range in which the task is performed. The date is entered in the format mm/dd to mm/dd and may cross over the end of one year to the beginning of the next year, for example "11/15 to 02/15".

See Preventive Maintenance Tasks.

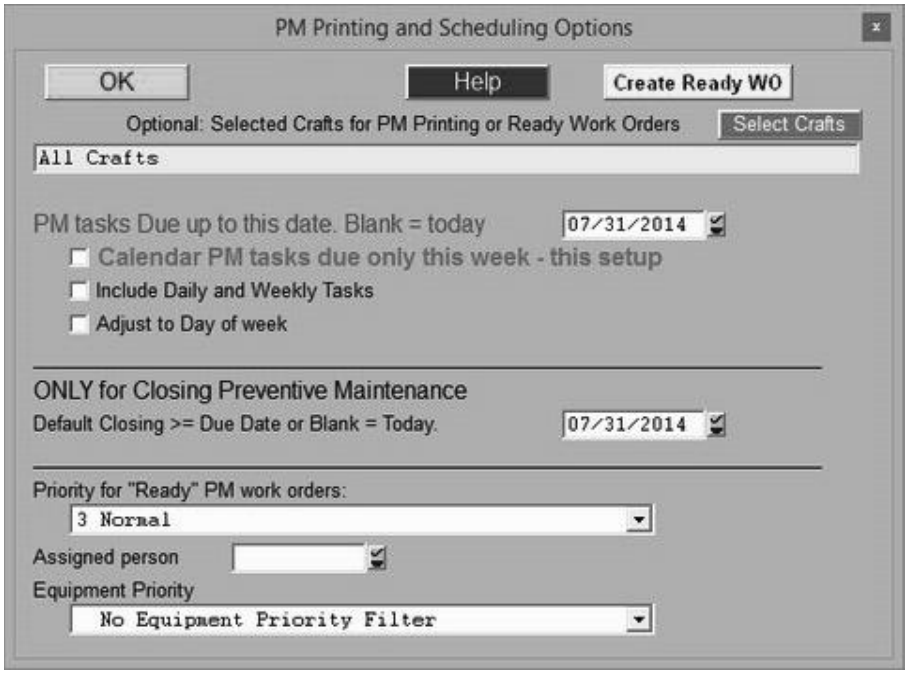
PM Printing and Scheduling Options

July 2014

www.DavisonSoftware.com

This window shows set up options for printing PM tasks from the "Due Preventive Maintenance" report or exporting to handheld. PM Tasks will indicate due with a check-mark according to these options. This window displays when you press the SETUP button or when you first open Scheduled Work.

See "Help – PM Basics" from the Scheduled Work menu for more about a weekly or monthly routine.


PM Printing and Scheduling Options
OK
Help
Create Ready WO
Optional: Selected Crafts for PM Printing or Ready Work Orders
Select Crafts
All Crafts
PM tasks Due up to this date. Blank = today
07/31/2014
Calendar PM tasks due only this week - this setup
Include Daily and Weekly Tasks
Adjust to Day of week
ONLY for Closing Preventive Maintenance
Default Closing >= Due Date or Blank = Today.
07/31/2014
Priority for "Ready" PM work orders:
3 Normal
Assigned person
Equipment Priority
No Equipment Priority Filter

When tasks are closed from handheld, the setup options are stored on the handheld device.

Pressing "Create Ready WO" saves the settings and then creates Ready PM work orders.

This is a popular method because personnel can see Preventive work orders in other windows without training in the use of this window for printing or closing PM.

In this case, Due Preventive Maintenance is not printed. Personnel do not use this Scheduled PM / Component PM window. They print and complete Ready Preventive work orders from the Work Order window.

- PM tasks Due (open) up to this Date. Blank = today:
  If blank, this date is the current date.

- Closing date, when tasks were done. Blank = today:
  PM is closed with a default Completed Date as follows:

  - Detailed PM:
    The PM Closing date as entered, usually same as PM Due date, equal or greater than the PM work order Scheduled Date.
    The PM Due date is validated to no more than 50 days greater than today with warnings about entering future dates.

  - Simple PM or PM Work Orders:
    The Completed Date for each PM work order equals the "Due Date" for that PM work order.

Each PM work order Completed Date can be changed, but not less than the Scheduled Date by default. Exceptions to the default are allowed.

- Calendar PM tasks due only this week:
  Check if you want PM scheduled for only one week. PM tasks that are overdue, earlier than one week prior to the PM Due date will not print or schedule. **This option must be checked at each setup. It is not saved.**
  You might want to print Calendar-scheduled PM for several weeks in advance. This allows printing the tasks in advance, each with a Due date ending for each week.
  This option is helpful when you want to print PM in advance, before a vacation or other absence.

• Include Daily and Weekly Tasks:
If checked, daily and weekly tasks are printed or scheduled. Otherwise daily and weekly tasks are not printed or closed here. **In most cases keep this un-checked**. Print Daily and Weekly tasks from "Reports => ALL Daily and Weekly for a checklist." You can account daily and weekly tasks as a total, but a work order for each task is not a reasonable.

• Adjust to Day of week:
Check this to adjust the scheduled date to the same day of week as the PM Start Date. This only affects frequencies less than annual. This is better where PM is printed weekly.

• PM work order priority:
This is the default priority for Completed or Ready PM work orders. You can change this priority in any work order after the work order is added.

PM Setup options selected in Temporary PM Printing Options in the reports menu.

• Print Due Readings from PredictMate:
If Checked, predictive readings from PredictMate print with preventive maintenance tasks. It is best to print these readings from PredictMate, but this provides them in one printout.

If you select certain Crafts, one of the following must be true:
- The same craft code must be used in PredictMate as a Personnel ID.
- Or the Personnel ID must exist in both PredictMate and in the CMMS, assigned to the same Craft. See Personnel Information in the CMMS and assign the same Craft.

Export to Handheld includes the note "<<< See PredictMate >>>" where PredictMate readings are due for the equipment unit. Export both Scheduled PM and Predictive readings in the same order for easier switching between Scheduled PM and Predictive on the handheld.

• Print components with due PM, no task description:
Check if you want to print a list of components with due PM, but do not need the task description.

• Page break at each unit:
Check if you want to print a new page with each unit.

• Page breaks with change of location code at position:
You may want the printout to print a new page *less* often than each change in location code. Enter the number of characters where a change will print a new page. For example, location codes "LC01 , LC02 , LC03..." will *not* print a new page with each change in location if you enter **2**. Since the first **2** characters are the same, the locations will print together on the same page.

Reports for Component Preventive Maintenance

- List PM Due

Print PM tasks due for each component. Components are sorted by Location. You can change to other sort orders and you might want to select only a scope of components.

Press

to set PM Printing options. See PM Printing and Scheduling Options before printing Due PM.

- Sum Estimated PM Hours

Check weekly PM scheduling with this report. This report lists the distribution of PM estimated hours scheduled per week. The count of tasks is an alternate indicator of PM scheduling in case accurate estimated hours are not available.

If some weeks are too busy, change some component PM start dates to shift their scheduled PM to other weeks. Then run this report again.

Weekly tasks are included since some weekly tasks could be seasonal. Daily tasks are not included. Estimated hours and number of tasks are identical to a list of Due PM only when weekly tasks are included in those listings.

- Components where PM Group has no PM tasks

Sometimes PM groups are assigned to components, but the PM group may not yet contain PM tasks. Components in this list need PM tasks added to their PM Group in “PM Task Setup”.

- Preventive Work Orders

Each of these reports print one work order for each PM task for each equipment. Preventive work orders with a status of Working, Ready, Hold, or Declined were created manually with a specific purpose. You can print only certian crafts by selecting crafts in the PM Printing Options.

Open (Working, Ready) Preventive Work Orders

Working or Ready preventive work orders are created for higher priority PM, to delay scheduling, or to add special notes.

Hold or Declined Preventive Work Orders

Hold or Declined preventive Work Orders stop the scheduling of the specific PM task for an equipment component.

Last Closed Preventive Work Orders

Every time a PM task is closed a Closed (Completed) PM work order is added. Special notes, personnel hours, and parts could be added to this work order. This work order shows the last time the PM task was completed for this equipment component.

Preventive Maintenance Groups

Enter Preventive Maintenance (PM) Group codes in this table. PM Group codes entered for Components or PM Tasks validate against the group codes entered to this table.

Automatic PM Scheduling

Check the **Auto** column to permit automatic scheduling for all equipment in that PM Group. Auto PM creates **Ready** PM work orders when the PM is due. This is the same as pressing **Create Ready WO** in Component PM setup, except that it occurs from a Task Scheduler. Usually this is scheduled once per week.

Setup:
1) Check the Auto column for PM Groups.
2) Run the following program from the Windows Task Scheduler (or equivalent scheduler):
Run: c:\DMSystem\PMAutoSchd.exe
Start in: c:\DMSystem\Data

For exceptions to automatically scheduling by PM Group, contact Davison Software support.
(PMAutoSchdFor= expression as character or Special function MyPMAutoSchd())

WARNING: This option can create many work orders. Use this option carefully. Start with only one PM Group to test the effect of scheduling.

Changing Related PM Group Codes

WARNING: When a PM Group code is changed here, the same PM Group Code in PM Tasks and Components is changed to the new code. Deleting a PM Group Code here does not delete any PM Tasks or Components.

Standard PM Components

Standard PM components are **only** required if you use standard PM tasks. In most applications standard PM tasks are not used. Standard PM tasks can be very useful for standardizing PM among many sites or for setting up PM where no PM procedures are established.

To assign standard PM tasks to a PM group, enter component codes. Standard PM tasks will print with Due PM according to the component codes assigned in this data window.

After assigning component codes, Select *Actions, Update PM Tasks* to add records to PM Task Setup. Otherwise some standard tasks may not schedule if a corresponding record for Craft and Frequency does not exist for the PM Group in PM Task Setup. Tag a single PM Group to update for only one PM Group. This is only required when building Standard PM.

PM Groups

The tasks in a Preventive Maintenance (PM) group are related to a component by the group code. Enter the tasks to a PM group, then enter the group code to components that require the PM in that group. If you change the PM tasks in a group, the changes appear in the next list of Due PM for each component in the group.

You can create a new PM group by duplicating an existing PM group. See “Actions”, “Create new PM group from old”. If records are tagged, they are used for the new group. Existing records in the new PM group are not replaced.

Each Group, Craft, Days, and Interval combination is unique. You are not allowed to enter more than one record of the same Group, Craft, Days, and Interval.

If you change a Craft, Frequency or Reading Interval, the **latest** Preventive work order for every component with the same PM Group is changed to keep its relation to this task. This prevents rescheduling when the task was already done with the original Craft, Frequency, or Reading Interval.

Standard PM Tasks

When standard PM tasks are assigned to a PM task, the standard PM tasks will print following any comments in the PM task description. An empty PM task description is acceptable when standard PM tasks are assigned.

Part Groups

Parts required for a PM task can be assigned to a part group related to the Parts (Stock Inventory) menu. Enter a part group and the parts will list with the PM task. When the PM is completed, you may subtract the number of parts in the part group from inventory.

Assigned To - The "Assigned to" field is intended only for PM tasks for a specialized person.

Images (Pictures) for PM Tasks

Images transfer to handheld and can print with PM Tasks. If an image exists named “<Group>_<Craft>_<Frequency>_<Interval>.JPG”, it is printed with the PM Task. The equipment component image is printed at the header for equipment.

For the handheld, create images selecting “Actions, Image View, Create images for handheld”. To copy or edit an image for a PM task, press “PM Image” from the image viewer in PM Task Setup. You are prompted to copy the image to an image for the PM Task. Then you can edit the image file specifically for this PM Task. See Image View about editing images.

Additional Insert Text after a PM Task

In some cases you might want a task added that is repeated often among several PM tasks, like a lockout procedure. Create Insert Text from "File, Text to Insert".
Right-click within the PM Task Description, then select 'Add keyword "== Additional <Description>"'.
This will add a keyword at the end of text so the program will add the "Insert Text" when printing the PM Tasks. Only one insert is allowed, and it will only print after the PM Task description.

Options for PM Scheduling

• Reading Interval

Enter Miles, hours, or any other reading except days or years in the "Interval" field. This field is optional
and only used for tasks that are scheduled by a reading. The "Type of Reading" is the unit for the reading (Miles, Hours, or other) but not days or years.

Combining Multiple Intervals (Cylces, Hours, Mileage, other)

In some cases PM is scheduled according to more than one interval, like cycles and hours. To schedule

PM for multiple intervals, schedule comparing to the lowest interval value. For example where PM is scheduled at 40 hours or 20,000 cycles, the lowest interval value is 40. Enter 40 to the Reading Interval

in PM Tasks. Compare cycles to hours as cycles divided by hours (20,000 cycles / 40 hours = 500 cycles per hour).
Record the accumulated reading to equipment as the highest common reading. In this example where PM is scheduled by cycles or hours, enter equipment readings as hours (or cycles divided by 500), whichever is greater. If the accumulated readings were 400 Hours and 300,000 cycles, the common reading is 600 (300,000 cycles / 500 cycles per hour = 600) which is greater than 400 hours. If PM was last done at a common reading of 550, this PM will now be scheduled (600 – 550 = 50 which is greater than the Reading Interval of 40).

• Days frequency

Valid entries for "Days frequency" are:
CD 10Y 5YR 4YR 3YR 2YR 1YR 180 120 90 60 45 30 21 14 7 1 0
0 is for initial startup tasks. CD is Condition-Directed from PredictMate.
Blank when interval only (Mileage or Run Hours).

• Season Month/Day

Seasonal tasks are scheduled by Month/Day. These PM tasks only schedule between the month/day period entered. The month/day period can cross from the end of one year to the beginning of the next. For example, 11/01 to 01/30.

• Seasonal option: If no frequency is entered and a season is entered, a seasonal task is assumed.

The task will schedule once after the season beginning Month/Day. This allows for spring or fall tasks different from a “1YR” frequency.

You can enter more than one seasonal task if you enter a number in the “interval” field. A negative number is recommended, to not conflict with other tasks in the same PM group that schedule by interval.

In this case the “interval” serves no purpose other than to make the PM task record unique within the PM
group and craft. This allows many seasonal tasks with different schedule dates of the Month/Day. Schedule dates are not adjusted for day-of-week.

For example, these PM task records are possible:

```
Craft Frequency Interval Season
MECH (Blank) -1 10/01 (Fall startup)
MECH (Blank) -2 04/01 (Spring shutdown)
or:
MECH (Blank) -1 03/01
MECH (Blank) -2 04/01
...
```

• Many tasks of the same frequency

Like seasonal tasks you can enter more than one task of the same craft and frequency if you enter a number in the “interval” field. A negative number is recommended.

An example of more than one task of the same frequency:

```
Craft Frequency Interval
MECH 30 -1
MECH 30 -2 (Same frequency with different tasks)
```

PM Scheduling Methods

All PM scheduling is reversible. When a PM task is closed a PM work order is created. You can recover from mistakenly closing PM by selecting one of the commands for re-opening PM in Component Scheduled PM.

PM for each component can be scheduled by one of four methods:

1) Interval scheduling:

Interval scheduling finds the latest reading (usually hours or mileage) from the component table. PM is due if the latest component reading minus the reading of the last PM completed for the same craft and days is more than the limit. If a days (for example 30 days) is entered in combination with a interval task, the PM task is due with either the interval or the days, whichever occurs sooner.

2) Time scheduling:

Time scheduling finds the last date PM was completed for the craft and frequency. The date for the next PM is calculated from the last completion plus the number of days for this frequency. If the current date is equal to or greater than the date for the next PM, the PM is due.

3) Calendar scheduling:

PM is scheduled by finding the latest completed PM work order, then comparing it's completion date to the schedule date. The schedule date is calculated using the component PM start date and the PM task frequency. PM is due if the schedule date is on or before the current date (or PM Due date).
The current schedule date is calculated from the PM start date entered in the Component window. The PM start date entered in the component window is the date that PM scheduling for the component begins. The PM start date can be changed to shift the PM schedule for the component.
Early closing of PM (up to one fourth of the frequency) is allowed and accounted as complete for the next schedule date with the following frequencies:

10Y 5YR 4YR 3YR 2YR 1YR 180 120 90 60 45 30
In the component screen, "Schedule Type:" is "T" or "C" for Time or Calendar.
The default value is "C" (Calendar).

Calendar scheduling is usually preferred since it sets a balance of PM hours scheduled from week to week. With time scheduling the PM hours for each week will probably vary.

The schedule date can be adjusted to the same day-of-week as the PM start date for the component for both *Time scheduling* and *Calendar Scheduling,* except for annual or greater frequencies. This is better where PM is accounted weekly.

Where PM is accounted monthly, a PM Start Date last day of the month is better. Each month enter a PM Due date of the last day of the month.

The practical due date is the date that you print PM tasks. If the PM is due on Wednesday and you print and distribute on Friday, the practical due date is Friday. PM Tasks that show a scheduled date a few days apart will print together and are done at the same time. PM tasks are usually printed from this application each week or monthly. Accounting Daily tasks on a daily basis is not practical from this application.

4) Condition-Directed:

Condition-Directed Tasks Setup

Condition-Directed (CD) tasks require setup in the CMMS and data input (readings for the Type and Position for each equipment) in PredictMate. In the CMMS, PM Task Setup:

1) Select the Frequency "Condition-Directed from PredictMate"
2) Enter a PredictMate Type code to Condition-Directed Type.
3) Optionally, enter a PredictMate Position to Condition-Directed Position.
CD tasks will become due according to readings in PredictMate.

When the CMMS Frequency is "Condition-Directed from PredictMate", the CMMS program warns you if you enter a PredictMate Type that is not valid from the table of Reading Types in PredictMate.
If the task "Reading Interval" is filled and the Condition-Directed Type begins "TOT" for totalizer reading, the task is due if the difference between the last PredictMate reading and the last completed PM work order is greater than the Reading Interval. Also, the equipment reading will be updated from the PredictMate reading.

NOTE: CD Position is not validated against PredictMate readings or Equipment limits. Take care to enter a position that either exists or will be added for readings in PredictMate for equipment in this PM Group.

Process

As PredictMate readings are input the CMMS CD tasks will become due only when the latest reading in PredictMate exceeds the CD limit. If the Condition-Directed Position is blank and no blank position for the type for the equipment exists in PredictMate, the CD task will become due according to any Position for the equipment in PredictMate of that Type that is greater than the maximum or less than the minimum.

The Reading Interval and Type of Reading in PM Task Setup is not related to PredictMate and does not affect CD tasks. However, you can enter a different Reading Interval (like -1, -2, ...) to additional records to allow additional CD tasks for the same PM Group and Craft.

Simple scheduling of CD tasks without PredictMate

For a simple alternative to schedule Condition-Directed (CD) tasks, you can set the Reading Interval for a PM task to 1. Then each time CD tasks should become due, increase the equipment component reading by 1. This only works where only one CD task is needed for the equipment component.

PM for a component will NOT schedule if:

- the unit is out of service.
- the “No” column in the Component PM window is checked.
- no PM group code is assigned to the component.
- a type "P" (Preventive) work order exists for the component (Ready status). The work order craft and days are the same. The work order scheduled date is greater than the current date. - a type "P" (Preventive) work order exists for the component with Hold or Declined status.
- you have created a setup that does not allow scheduling of a craft, daily/weekly, or the PM Due Date is different.
- a Condition-Directed task has no related readings in PredictMate or the readings are prior to the PM Start date.

Commands that help improve Preventive Maintenance (PM) Estimated Hours

F8, Get Average Actual Hours for PM Tasks

Completed PM work orders are scanned for actual hours and the average is put to the Average Actual Hours field for each task. All records are updated unless you select a scope or tag records in the data browser. This has no effect on the scheduled PM task list.
After running this command, compare the average actual hours to the current estimated hours. The F9 command can replace estimated hours with the average actual hours for many records. You may prefer to individually change the estimated hours different than the average actual hours.

F9, Replace Task Estimated Hours with Actual hours

Average Actual Hours are put to the Estimated Hours field. All records are updated unless you select a scope or tag records in the data browser. You might only select records where you agree that the average actual hours as better than the current estimated hours. When Average Actual Hours equals zero, Estimated Hours are not overwritten with zero.

Part Information

Part Information is ordered by stock code, description, or location. To add new part information, press Actions then select “Add”.

Press the image view button in the tool bar to view the selected image file. Image files named the same as the Stock Code will relate even if not entered to the "Image File" field.

Enter the number of a part received or used in the columns. Note that the number of parts “In Stock” or “Total Used” change as you enter the number received or used.

Press F7 or press Vendors to display vendors for the selected part and assign or review vendor part numbers. Enter the cost for parts here. A blank vendor code is acceptable so that part cost can be entered without vendor information.

Press “Actions, Part Groups” or F8 to review and assign part groups for the selected part. In the part groups window the quantity field indicates the quantity of the part required in that group.

If you change a part stock code, the same code in part groups will be changed. If you delete a part (stock code) the same stock code in part groups will be deleted.

Parts Information Fields

- Stock Code:

Code for identifying and ordering each part record. The stock code is your code for cross-reference to vendor part numbers. Your stock code is the same regardless of each vendor's part number.

- Primary Stock Location:

Physical location of the part. This may represent a plant location or a bin number. The primary location is the first place you expect to find this part in the greatest quantity. The program maintains the quantity in stock, quantity on order, reorder point, and total use by the primary stock location only.

- Secondary Stock Location:

Other locations where the part is stored, limited to about 8 locations.

- Quantity in Stock:

Total quantity currently in stock.

- Quantity on Order:

Number of parts currently on order from a vendor.

- Reorder Point:

Minimum number of this part before ordering more. Enter -1 for no more
0 orders of the part.

- Reorder Margin:

The additional number of parts that you order when the number of parts is less than the Reorder Point. If the Reorder Point is 5 and the number In Stock is 3 and the Reorder Margin is 5, you order 7 parts.

- Total Use:

Total number of this part used.

- Lead Time (Days):

Number of days between placing an order and delivery of the part.

- Description:

A description of the part (45 character limit).

- Receive Parts:

Enter number of parts received. This entry increases the Quantity and decreases Quantity on Order.

- Use Parts:

Enter number of parts used. The new Quantity and Total Use is calculated.

- Price Column

You can change vendor price directly in the "Price" column. If a vendor exists for this part, the price is changed for the first vendor found. Otherwise, a record is added with the price.

Reports for Part Information (Inventory)

- Reorder Parts

Lists parts where the quantity in stock is less than or equal to the Reorder point. Parts in this list should be ordered from a vendor.

The “Need to Order” column is calculated as follows:

Need to order = Reorder Point - (In Stock + On order) + Reorder Margin

- Vendors for Stock

Lists vendors for each part with the vendor’s part number and price.

- Work Orders with insufficient parts

See Reports for Work Orders.

Stock Location

Add plant location codes and their descriptions in this window. Other windows use these codes for validation. Add a blank code if you wish to allow no stock location.

Vendor Information

Vendor information contains business address, telephone, and contact. A note field provides space for miscellaneous information and additional addresses and phone numbers.

Vendor priority is assigned by Vendor Code. Precede the vendor code with a number or letter to indicate vendor priority. For example a vendor code "1-Vend02" is higher priority than "2-Vend01".

Press “Parts” to review or assign stock available from this vendor. Enter the vendor cost for parts here.

From Actions, Shift-F3, check for duplicate Vendor Codes from the current record forward.

If you change a vendor code, the same code will be changed in part information in order to keep the relation. If you DELETE a vendor, the vendor relation in part information will be deleted.

Purchase Orders

You can select parts from each vendor to create purchase orders. Purchase Orders can be emailed to the vendor with line items attached to the email. You can select other exports (HTML) from the actions menu.

Vendor Inventory

Parts (Inventory) for vendor contains parts available from each vendor. Stock code is validated against parts information. The part description is displayed from part information and cannot be changed here. Enter the cost for parts from each vendor here.

Parts in your system are cross-referenced by the Stock Code to each Vendor part number.

Part Codes Relation

- Stock Code:

Unique to each part.

- Part Group Code:

Contains a group of stock codes. The part group code is assigned to a component, work order, or PM task with the quantity, vendor, and price of the part in that group.

- Vendor code:

Unique to each vendor. More than one stock code is assigned to a vendor. Vendor part numbers are cross-referenced to a stock code.

- Part location code:

A plant location or bin number for the part.

Example Relationships